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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/761,416	01/22/2004	Koji Sumi	Q79453	3209
23373	7590	09/01/2005	EXAMINER	
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			DICT, RACHEL S	
			ART UNIT	PAPER NUMBER
			2853	

DATE MAILED: 09/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

10/761,416

Applicant(s)

SUMI, KOJI

Examiner

Rachel Dicht

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1/22/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 7 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. See MPEP § 608.01(n). Accordingly, the claim has not been further treated on the merits.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 3, 4, 6, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masumoto et al. (US Pat. No. 6,830,302).

In regard to:

Claim 1:

Masumoto et al. teaches a method for driving a liquid-jet head comprising a passage-forming substrate (5, Fig. 2) in which pressure generating chambers (3, Fig. 2) communicating with nozzle orifices (14, Fig. 2) are formed; and a piezoelectric element 921, Fig. 2) provided on one surface of said passage-forming substrate via a vibration plate, said piezoelectric element consisting of a lower electrode (22, Fig. 2), a piezoelectric layer (23, Fig. 2), and an upper

electrode (24, Fig. 2), wherein said piezoelectric layer consists of a relaxor ferroelectric (refer to column 6 lines 45-47), a voltage between a potential V_1 , at which a capacitance of said piezoelectric element is maximal in a capacitance-potential curve of said piezoelectric element, and a potential V_2 , which has a larger absolute value than an absolute value of said potential V_1 and at which an inflection point in said capacitance-potential curve is reached, is set as a drive start potential V_0 , and said piezoelectric element is driven using a drive waveform having an ejection step for changing a potential from said drive start potential V_0 to a potential V_3 (refer to column 7 lines 28-67 to column 8 line 1-5) (Fig. 4).

It is noted however that Masumoto et al. fails to teach a driving electric filed having an electric field strength of 100 to 500 kV/cm.

However, Masumoto et al. discloses the claimed invention except for having an electric field strength of 100 to 500 kV/cm. It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the specified electric field strength, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Claim 2:

Masumoto et al. teaches the method for driving the liquid-jet head wherein said drive waveform has, before said ejection step, a first expansion step for changing the potential from an intermediate potential, which has polarity identical with polarity of said drive start potential V_0 and has larger absolute value than an absolute value of said drive start potential V_0 , to said drive start potential V_0 to expand said pressure generating chamber (refer to column 7 lines 28-67 to column 8 line 1-5).

Claim 3:

Masumoto et al. teaches the method for driving the liquid-jet head wherein said drive waveform has, after said ejection step, a second expansion step for changing the potential from said potential V_3 to an intermediate potential, which has polarity identical with polarity of said potential V_3 and has smaller absolute value than an absolute value of said potential V_3 , to expand said pressure generating chamber (refer to column 7 lines 28-67 to column 8 line 1-5).

Claim 4:

Masumoto et al. teaches the method for driving the liquid-jet head wherein said drive waveform further has, after said ejection step, a relaxation step for changing the potential from predetermined intermediate potential to a potential V_4 , which has polarity identical with polarity of said drive start potential V_0 and has smaller absolute value than an absolute value of said drive start potential V_0 ,

and then returning the potential from said potential V_4 to said intermediate potential (refer to column 7 lines 28-67 to column 8 line 1-5).

Claim 5:

Masumoto et al. teaches the method for driving the liquid-jet head wherein said drive waveform further has, after said ejection step, an initialization step for changing the potential from a predetermined intermediate potential to a potential V_5 , which is $-V_3$, and then returning the potential from said potential V_5 to said intermediate potential (refer to column 1 lines 26-41) (Fig. 8).

Claim 6:

Masumoto et al. teaches the method for driving the liquid-jet head wherein a film thickness of said piezoelectric layer is 0.5 to 1.0 μm (refer to column 6 lines 45-47).

Claim 7:

Masumoto et al. teaches the method for driving the liquid-jet head wherein said passage-forming substrate consists of a single crystal silicon substrate, and each layer of said piezoelectric element is formed by film deposition and lithography.

The method of forming the device is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight.

Claim 8:

Masumoto et al. teaches a method for driving a liquid-jet head comprising a passage-forming substrate (5, Fig. 2) in which pressure generating chambers (3, Fig. 2) communicating with nozzle orifices (14, Fig. 2) are formed; and a piezoelectric element 921, Fig. 2) provided on one surface of said passage-forming substrate via a vibration plate, said piezoelectric element consisting of a lower electrode (22, Fig. 2), a piezoelectric layer (23, Fig. 2), and an upper electrode (24, Fig. 2), wherein said piezoelectric layer consists of a relaxor ferroelectric (refer to column 6 lines 45-47), a voltage between a potential V_1 , at which a capacitance of said piezoelectric element is maximal in a capacitance-potential curve of said piezoelectric element, and a potential V_2 , which has a larger absolute value than an absolute value of said potential V_1 and at which an inflection point in said capacitance-potential curve is reached, is set as a drive start potential V_0 , and said piezoelectric element is driven using a drive waveform having an ejection step for changing a potential from said drive start potential V_0 to a potential V_3 (refer to column 7 lines 28-67 to column 8 line 1-5) (Fig. 4).

It is noted however that Masumoto et al. fails to teach a driving electric field having an electric field strength of 100 to 500 kV/cm.

However, Masumoto et al. discloses the claimed invention except for a driving electric field with a strength of 100 to 500 kV/cm. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the specified electric field strength, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rachel Dicht whose telephone number is 571-272-8544. The examiner can normally be reached on 7:00 am - 3:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571-272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2853

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RSD

Red Dwt
August 24, 2005

MSH 8/26/05
MANISH S. SHAH
PRIMARY EXAMINER